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January 11, 2000

ATTN: BOX PCT
Assistant Commissioner for Patents
Washington, D.C. 20231

ATTN: BOX PCT

Re: Application of **Hisashi YAMADA and Akihiro GOTO**
GREEN-COMPACT ELECTRODE FOR DISCHARGE SURFACE TREATMENT, MANUFACTURING METHOD THEREFOR, METHOD AND APPARATUS FOR PERFORMING DISCHARGE SURFACE TREATMENT AND METHOD OF RECYCLING GREEN-COMPACT ELECTRODE FOR DISCHARGE SURFACE TREATMENT
Our Reference: Q57317
PCT/JP98/04707, filed October 19, 1998

Dear Sir:

Applicants herewith submit the attached papers for the purpose of entering the National stage under 35 U.S.C. § 371 and in accordance with Chapter I of the Patent Cooperation Treaty. Attached hereto is the application identified above which is a translation of **PCT International Application No. PCT/JP98/04707, filed October 19, 1998**, comprising the specification, claims, four (4) sheets of drawings, executed Declaration and Power of Attorney, Information Disclosure Statement, PTO Form 1449 with references, International Search Report, executed Assignment and PTO Form 1595.

The Government filing fee is calculated as follows:

Total Claims	7 - 20 =	0 x $18 =	$ 000.00
Independent Claims	5 - 3 =	2 x $78 =	$ 156.00
Base Filing Fee	($840.00)		$ 840.00
Multiple Dep. Claim Fee	($260.00)		$ 000.00
TOTAL FILING FEE			**$ 996.00**
Recordation of Assignment Fee			$ 40.00
TOTAL U.S. GOVERNMENT FEE			**$ 1,036.00**

Checks for the statutory filing fee of **$ 996.00** and Assignment recordation fee of **$ 40.00** are attached. You are also directed and authorized to charge or credit any difference or overpayment to Deposit Account No. 19-4880. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. 1.492; 1.16 and 1.17 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

Priority is claimed from:

Japanese Patent Application	Filing Date
P.Hei. 10-130316	May 13, 1998

Respectfully submitted,
SUGHRUE, MION, ZINN, MACPEAK & SEAS
Attorneys for Applicant(s)

By _____
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Registration No. 23,063

DM:clf

DESCRIPTION

GREEN-COMPACT ELECTRODE FOR DISCHARGE SURFACE TREATMENT, MANUFACTURING METHOD THEREFOR, METHOD AND APPARATUS FOR PERFORMING DISCHARGE SURFACE TREATMENT AND METHOD OF RECYCLING GREEN-COMPACT ELECTRODE FOR DISCHARGE SURFACE TREATMENT

Technical Field

The present invention relates to improvements in a green-compact electrode for discharge surface treatment with which a discharging operation is performed in working fluid to form a hard coating film on the surface of an object which must be processed, a manufacturing method therefor, a method and an apparatus for performing discharge surface treatment and a method of recycling green-compact electrode for discharge surface treatment.

Background of the Invention

A conventional technique for performing discharge surface treatment has been disclosed in Japanese Patent Laid-Open No. 9-192937. According to the foregoing disclosure, a material for producing a hard carbide, such as Ti, is employed to serve as an electrode. Then, discharge is caused to occur with a metal material, which is a material to be machined, so that a strong hard coating film is formed on the surface of the metal which is a material to be machined.

Fig. 5 shows a method of molding a green-compact electrode obtained by compression-molding metal powder or the like and arranged to serve as the electrode for use in the discharge surface treatment process. Referring to Fig. 5, reference numeral 51 represents a punch, 52 represents a die and 53 represents a green-compact electrode in the form of powder. The powder green-compact electrode is compression-molded by using a mold.

When the green-compact electrode shown in Fig. 5 is molded, great pressure is generated on the side surfaces of the die 52. Therefore, mold release characteristics required after the molding process are unsatisfactory. Thus, there arises a problem in that the green-compact electrode obtained by compression molding is easily broken. Another problem arises in that the green-compact electrode is too brittle. Therefore, there arises a problem in that the manufacturing yield of the green-compact electrode excessively deteriorates. When the brittle green-compact electrode is employed in a discharge surface treatment, there arises a problem in that the hard coating film formed on the object, which has been subjected to the discharge surface treatment, cannot be uniformed.

To overcome the above-mentioned problems, a mold release agent or a hardener is required. When oleic acid or the like is employed which is usually employed as a mold release agent for a sintered body, the mold release agent disperses and melted in the working fluid. Therefore, components in the

working fluid are changed. Therefore, there arises a problem in that a coating film having a required quality and hardness cannot be formed on the surface of the object which must be machined. Also usual hardeners suffer from similar problems.

Disclosure of the Invention

To overcome the above-mentioned problems, a first object of the present invention is to improve the brittleness of a green-compact electrode for discharge surface treatment so as to form a stable and uniform hard coating film on an object which must be machined by performing discharge surface treatment using the green-compact electrode for the discharge surface treatment.

A second object of the present invention is to improve the mold release characteristics and hardenability of a green-compact electrode for discharge surface treatment required to perform compression molding so as to efficiently manufacture the green-compact electrode for discharge surface treatment.

A third object of the present invention is to obtain a method and apparatus for performing discharge surface treatment which do not exert an influence on the formation of a hard coating film on an object, which must be machined, even if the discharge surface treatment is repeated and enabling the characteristics for forming a uniform coating film of the material of the electrode to be exhibited.

A fourth object of the present invention is to obtain a method of recycling a green-compact electrode for discharge surface treatment.

A green-compact electrode for discharge surface treatment disclosed in a first aspect of the present invention is obtained by mixing a material of the green-compact electrode for discharge surface treatment and fluid which is the same as the working fluid.

A green-compact electrode for discharge surface treatment disclosed in a second aspect of the present invention has a structure that a mixture ratio of the fluid which is the same as the working fluid with respect to the green-compact electrode for discharge surface treatment is 5 wt% to 10 wt%.

A method of manufacturing a green-compact electrode for discharge surface treatment disclosed in a third aspect of the present invention comprises the step of:
compression-molding a mixed material of a material of a green-compact electrode for discharge surface treatment and fluid which is the same as working fluid to manufacture a green-compact electrode for discharge surface treatment.

A method of manufacturing a green-compact electrode for discharge surface treatment disclosed in a fourth aspect of the present invention comprises the step of:
compression-molding a mixed material having a structure that a mixture ratio of the fluid which is the same as the working fluid with respect to the green-compact electrode for

discharge surface treatment is 5 wt% to 10 wt% to manufacture a green-compact electrode for discharge surface treatment.

A method of performing discharge surface treatment disclosed in a fifth aspect of the present invention comprises the step of: using a mixed material of a material of the green-compact electrode for discharge surface treatment and fluid which is the same as the working fluid as an electrode.

An apparatus for performing discharge surface treatment disclosed in a sixth aspect of the present invention comprises: a material of the green-compact electrode for discharge surface treatment and fluid which is the same as the working fluid which constitute the green-compact electrode for discharge surface treatment.

A method of recycling a green-compact electrode for discharge surface treatment disclosed in a seventh aspect of the present invention comprises: a compression molding step for molding a mixed material of a material of the green-compact electrode for discharge surface treatment and fluid which is the same as the working fluid; a discharge surface treatment step for performing a discharge surface treatment process by using an electrode obtained by compression molding; and a pulverizing step for forming portions in which the electrodes are left after the discharge surface treatment step has been completed into powder, wherein the compression molding step and following steps are repeated after the pulverizing step has been completed.

Brief Description of the Drawings

Fig. 1 is a diagram showing a structure of a molded green-compact electrode for discharge surface treatment according to a first embodiment of the present invention;

Fig. 2 is a cross sectional view showing a mold for use to perform compression molding of a green-compact electrode for discharge surface treatment according to the present invention;

Fig. 3 is a structural view showing a concept of a discharge surface treatment apparatus;

Fig. 4 is a block diagram showing a flow of a recycling process of a green-compact electrode for discharge surface treatment according to the present invention; and

Fig. 5 is a diagram showing a conventional method of compression-molding a green-compact electrode for discharge surface treatment.

Best Mode for Carrying Out the Invention

First Embodiment

Fig. 1 is a diagram showing the structure of a molded green-compact electrode for discharge surface treatment according to a first embodiment of the present invention. Referring to Fig. 1, reference numeral 11 represents powder of metal, such as W or Ti. Reference numeral 12 represents fluid which is the same as working fluid and which has been solidified by compression molding so that a green-compact electrode 1 has been molded. Fig. 2 is a cross sectional view

showing a mold for use in a process for compression-molding the green-compact electrode 1. Reference numeral 21 represents a punch and 22 represents a die.

Fig. 3 is a structural view showing a concept of a discharge surface treatment apparatus. Referring to Fig. 3, reference numeral 1 represents a green-compact electrode, 2 represents an object 2 which must be machined, 3 represents a working tank, 4 represents oil-based working fluid of a kerosene type, 5 represents a switching element for switching voltage and an electric current which are exerted to the green-compact electrode 1 and the object 2 which must be machined and 6 represents a control circuit for controlling the switching operation of the switching element 5. Reference numeral 7 represents an electric power source, 8 represents a resistor unit and 9 represents a formed hard coating film.

Then, the discharge surface treatment according to this embodiment will now be described. To mold the green-compact electrode 1 shown in Fig. 1, a mixture of metal powder 11, which is a material of the green-compact electrode and fluid 12 which is the same as the working fluid is injected into a die 22 structured as shown in Fig. 2. The punch 21 is operated to exert a pressure of about some hundreds of MPa so that the electrode is compression-molded into an arbitrary shape. The metal powder 11 and the fluid 12 which is the same as the working fluid are mixed with each other, and then the compression molding is performed. Therefore, an effect can

be obtained in that the mold release characteristics can be improved and bonding force of powder can be enlarged.

A case in which the metal powder 11 is made of Ti will now be described. Referring to Fig. 3, pulse-like discharge is caused to occur between the green-compact electrode 1 and the object 2 which must be machined while a proper gap (10 μm to tens of 10μm) between the green-compact electrode 1, which has been compression-molded, and the object 2 which must be machined is being maintained. Thus, the green-compact electrode 1 is worn owing to the energy of the discharge. Therefore, carbon which is the component in the working fluid 4 and Ti which is the component in the green-compact electrode 1 react with each other, causing hard TiC to be produced. As a result, the hard coating film 9 is formed on the surface of the object which must be machined. The fluid 12, which is the same as the working fluid and which has been mixed into the green-compact electrode 1 when the molding operation has been performed, are dispersed and melted in the working fluid on discharge. Since the fluid 12 has the same components as those of the working fluid 4, change in the components and the component ratio in the working fluid 4 after dispersion and melting can be inhibited. Therefore, the discharge surface treatment which is performed by using the green-compact electrode 1 is free from adverse influence of dispersion and melting of the fluid 12, which is the same as the working fluid and which has been mixed with the

green-compact electrode 1, on the formation of the hard coating film on the object which must be machined.

When the mixture ratio of the fluid 12, which is the same as the working fluid, with respect to the green-compact electrode 1 is 5 wt% to 10 wt%, the mold release characteristics and brittleness realized after the green-compact electrode has been molded can considerably be improved. Therefore, breakage of the mold can be prevented. Moreover, no adverse influence is exerted on the formation of the hard coating film on the object which must be machined. The foregoing facts have been confirmed from experiments.

Second Embodiment

Although the first embodiment is structured such that the working fluid 4 is oil-based working fluid of a kerosene type, a polymer compound or its solution may be employed as the working fluid to obtain similar effects.

Third Embodiment

When the first and second embodiments are structured such that the green-compact electrode 1 employed to form the hard coating film 9 on the object 2 which must be machined is pulverized into sizes which can be compression-molded, the green-compact electrode can be reproduced by using the pulverized material. Fig. 4 is a block diagram showing a flow of a recycling process of the green-compact electrode 1. Referring to Fig. 4, reference numeral 41 represents a compression-molding step for compression-molding the mixture of the metal powder 11 and the fluid 12, which is the same

as the working fluid, to manufacture the green-compact electrode 1. Reference numeral 42 represents a discharge surface treatment step for forming the hard coating film 9 on the object 2 which must be machined by using the green-compact electrode 1. Reference numeral 43 represents a pulverizing step for pulverizing a portion of the green-compact electrode left after the discharge surface treatment step has been completed. The material formed into powder in the pulverizing step 43 is adjusted in such a manner that the mixture ratio of the metal powder 11 and the fluid 12 which is the same as the working fluid is made to be a predetermined value. Then, the compression molding process is performed. Thus, the material can again be used in the discharge surface treatment step 42 as the green-compact electrode 1. The components formed into powder in the pulverizing step 43 were analyzed. As a result, only the components of the metal powder 11 and the working fluid 4 detected before the discharge surface treatment were observed. Therefore, a fact was confirmed that the metal powder 11, which has not been subjected to the discharge surface treatment, does not degenerate owing to the discharge surface treatment. The reason for this lies in that great consumption of the green-compact electrode 1 owing to the energy of the discharge does not permit a portion on which an influence of heat produced by the discharge to be left in the green-compact electrode 1. That is, when the used green-compact electrode 1 is pulverized, the powder of the used green-compact

electrode 1 is a mixture of the metal powder 11, which has not been subjected to the discharge surface treatment, and the working fluid 4. Thus, recycling of the green-compact electrode 1 is permitted.

Since the present invention is structured as described above, the following effects can be obtained.

The green-compact electrode for discharge surface treatment disclosed in the first aspect of the present invention is obtained by mixing the fluid which is the same as the working fluid and the material of the green-compact electrode for discharge surface treatment. Therefore, the brittleness of the green-compact electrode for the discharge surface treatment can be improved. Moreover, an effect can be obtained in that the discharge surface treatment using the foregoing green-compact electrode for the discharge surface treatment enables a stable and uniform hard coating film to be formed on the object which must be machined.

The green-compact electrode for discharge surface treatment disclosed in the second aspect of the present invention has the structure that the mixture ratio of the fluid which is the same as the working fluid with respect to the green-compact electrode for discharge surface treatment is 5 wt% to 10 wt%. Therefore, effects similar to those obtainable from the first aspect of the present invention can be obtained.

The method of manufacturing a green-compact electrode for discharge surface treatment disclosed in the third aspect

of the present invention comprises the step of: compression-molding the mixed material of the material of the green-compact electrode for discharge surface treatment and fluid which is the same as working fluid to manufacture the green-compact electrode for discharge surface treatment. Therefore, the mold release characteristics and hardenability of the green-compact electrode for discharge surface treatment required in the compression molding process can be improved. As a result, an effect can be obtained in that the green-compact electrode for discharge surface treatment can efficiently be manufactured.

The method of manufacturing a green-compact electrode for discharge surface treatment disclosed in the fourth aspect of the present invention comprises the step of: compression-molding the mixed material having the structure that the mixture ratio of the fluid which is the same as the working fluid with respect to the green-compact electrode for discharge surface treatment is 5 wt% to 10 wt% to manufacture the green-compact electrode for discharge surface treatment. Therefore, effects similar to those obtainable from the third aspect can be obtained.

The method of performing discharge surface treatment disclosed in the fifth aspect of the present invention comprises the step of: using the mixed material of the material of the green-compact electrode for discharge surface treatment and fluid which is the same as the working fluid as an electrode. Therefore, repetition of the discharge

surface treatment does not exert an influence on the formation of the hard coating film on the object which must be machined. Hence it follows that an effect can be obtained in that uniform hard coating film can be formed and the film forming performance of the material of the electrode can be obtained.

The apparatus for performing discharge surface treatment disclosed in the sixth aspect of the present invention comprises: the material of the green-compact electrode for discharge surface treatment and the fluid which is the same as the working fluid which constitute the green-compact electrode for discharge surface treatment. Therefore, an effect can be obtained in that the discharge surface treatment apparatus can be obtained with which repetition of the discharge surface treatment does not exert an influence on the formation of the hard coating film on the object which must be machined. Hence it follows that an effect can be obtained in that uniform hard coating film can be formed and the film forming performance of the material of the electrode can be obtained.

The method of recycling a green-compact electrode for discharge surface treatment disclosed in the seventh aspect of the present invention comprises: the compression molding step for molding the mixed material of the material of the green-compact electrode for discharge surface treatment and the fluid which is the same as the working fluid; the discharge surface treatment step for performing the discharge surface treatment process by using the electrode obtained by

compression molding; and the pulverizing step for forming portions in which the electrodes are left after the discharge surface treatment step has been completed into powder, wherein the compression molding step and following steps can be repeated after the pulverizing step has been completed. Therefore, an effect can be obtained in that recycling of the green-compact electrode for the discharge surface treatment is permitted.

Industrial Applicability

As described above, the greem-compact electrode for discharge surface treatment according to the present invention is suitable for the discharge surface treatment operation in that a hard coating film is formed on the surface of an object which must be machined by performing a discharge process in working fluid. Also, a method of manufacturing the green-compact electrode for discharge surface treatment according to the present invention is suitable for manufacturing an electrode for the aforementioned discharge surface treatment. Further, a method and an apparatus for performing the discharge surface treatment according the the present invention are suitable for the aforementioned discharge surface treatment operation. Furthermore, a method of recycling the green-compact electrode for discharge surface treatment according to the present invention is suitable for the aforementioned discharge surface treatment operation.

CLAIMS:

1. A green-compact electrode for discharge surface treatment which uses a discharging operation in working fluid so as to form a hard coating film on the surface of an object which must be machined, said green-compact electrode for discharge surface treatment being characterized by comprising:

a mixed material of a material of said green-compact electrode for discharge surface treatment and fluid which is the same as said working fluid.

2. A green-compact electrode for discharge surface treatment according to claim 1, characterized in that a mixture ratio of the fluid which is the same as said working fluid with respect to said green-compact electrode for discharge surface treatment is 5 wt% to 10 wt%.

3. A method of manufacturing a green-compact electrode for discharge surface treatment charcterized by comprising the step of: compression-molding a mixed material of a material of a green-compact electrode for discharge surface treatment and fluid which is the same as working fluid to manufacture a green-compact electrode for discharge surface treatment.

4. A method of manufacturing a green-compact electrode for discharge surface treatment according to claim 3, characterized in that a mixture ratio of the fluid which is the same as said working fluid with respect to said green-compact electrode for discharge surface treatment is 5 wt% to 10 wt%.

5. A method of performing discharge surface treatment such that a green-compact electrode for discharge surface treatment is used and a discharging process in working fluid is performed to form a hard coating film on the surface of an object which must be machined, said method of performing discharge surface treatment being characterized by using a mixed material of a material of said green-compact electrode for discharge surface treatment and fluid which is the same as said working fluid as an electrode.

6. An apparatus for performing discharge surface treatment for forming a hard coating film on the surface of an object which must be machined by using a green-compact electrode for discharge surface treatment and by performing a discharging operation in working fluid, said apparatus for performing discharge surface treatment being characterized by comprising:

a material of said green-compact electrode for discharge surface treatment and fluid which is the same as said working

fluid which constitute said green-compact electrode for discharge surface treatment.

7. A method of recycling a green-compact electrode for discharge surface treatment including a discharge surface treatment step for forming a hard coating film on the surface of an object which must be machined by using a green-compact electrode for discharge surface treatment and performing a discharging operation in working fluid, said method of recycling a green-compact electrode for discharge surface treatment being characterized by comprising:

a compression molding step for molding a mixed material of a material of said green-compact electrode for discharge surface treatment and fluid which is the same as said working fluid;

a discharge surface treatment step for performing a discharge surface treatment process by using an electrode obtained by compression molding; and

a pulverizing step for forming portions in which said electrodes are left after said discharge surface treatment step has been completed into powder, wherein

said compression molding step and following steps are repeated after said pulverizing step has been completed.

ABSTRACT

A green-compact electrode (1) for discharge surface treatment for use in a discharge surface treatment operation for forming a hard coating film (9) on the surface of an object (2) which must be machined by performing a discharging operation in working fluid (4) is structured such that powder (11) made of metal, such as W or Ti, and fluid (12) which is the same as working fluid are mixed with each other, and the mixed substance is compression-molded so that the green-compact electrode (1) for the discharge surface treatment is obtained.

FIG. 1

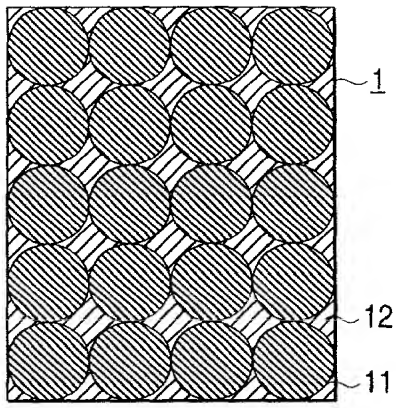


FIG. 2

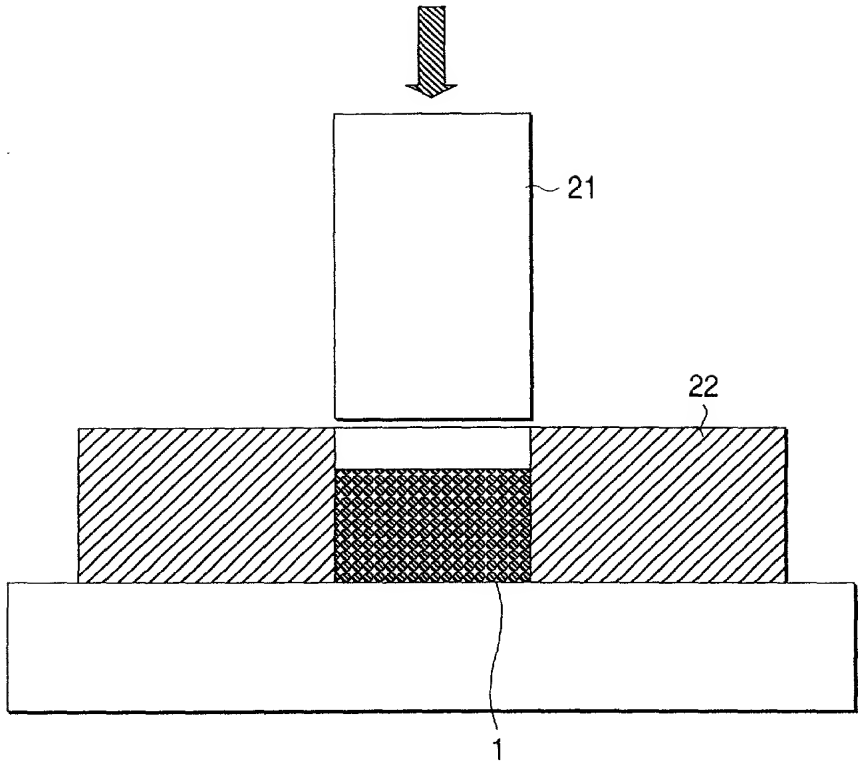


FIG. 3

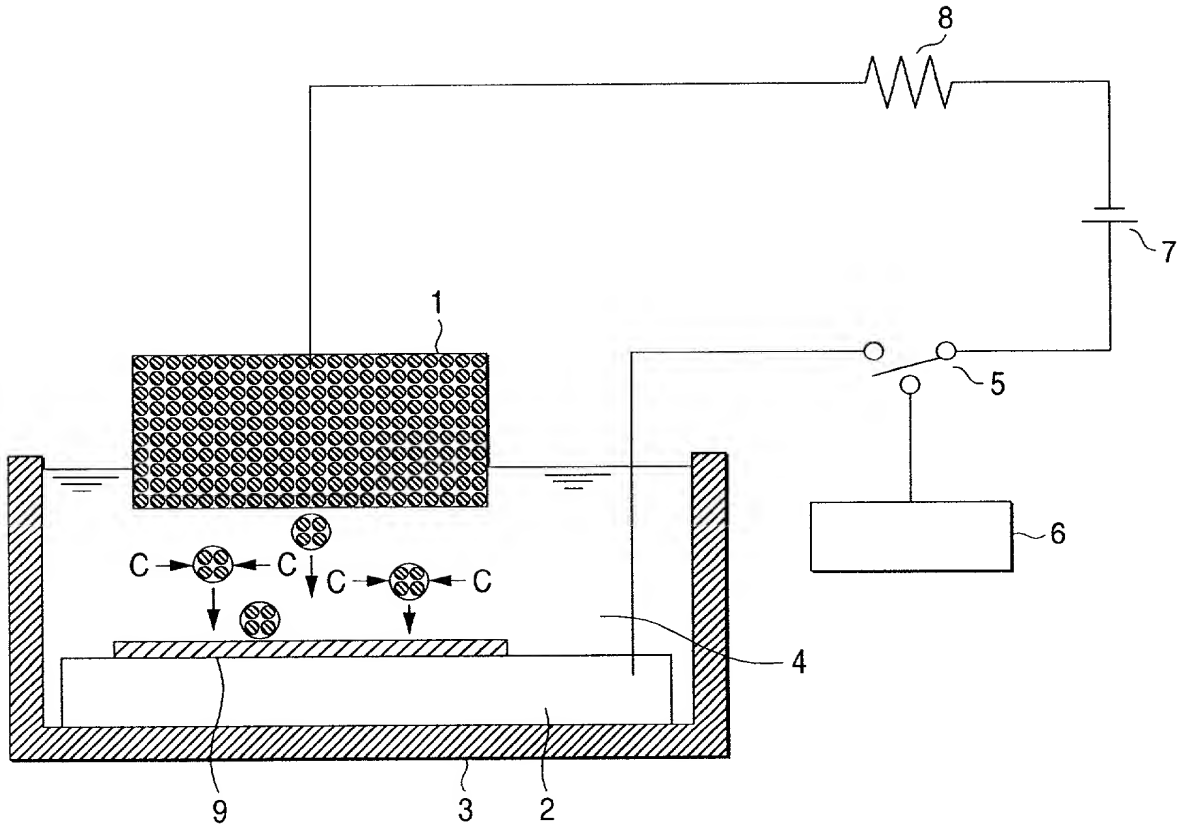


FIG. 4

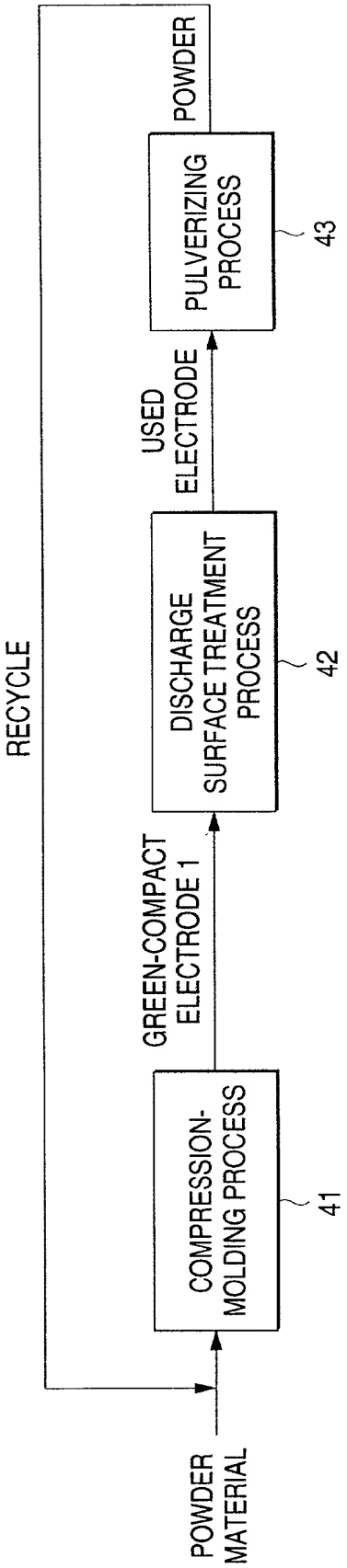
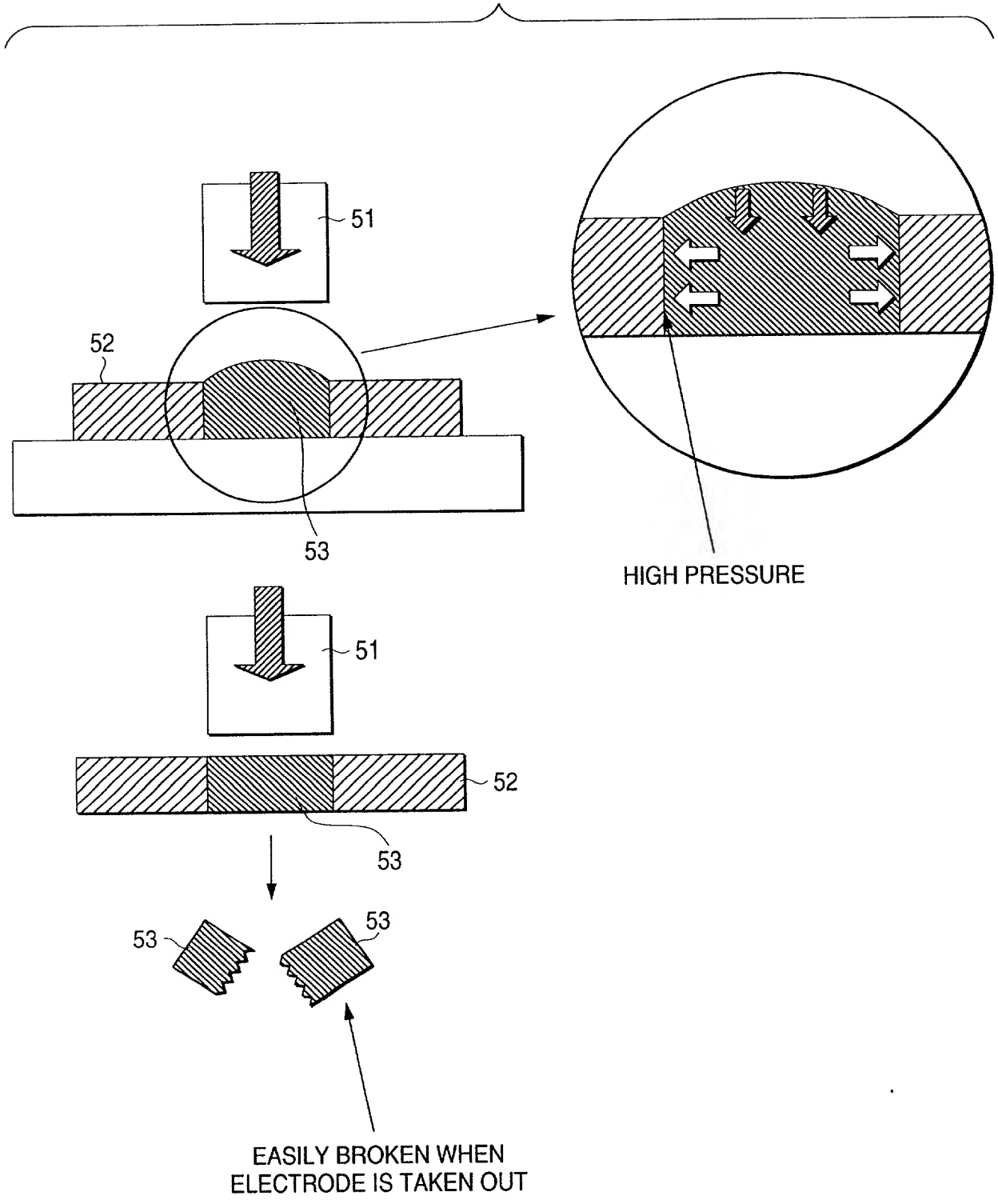

POWDER MATERIAL
COMPRESSION-MOLDING PROCESS
41
GREEN-COMPACT ELECTRODE 1
DISCHARGE SURFACE TREATMENT PROCESS
42
USED ELECTRODE
PULVERIZING PROCESS
43
POWDER
RECYCLE

FIG. 5


51
52
53
HIGH PRESSURE
51
52
53
53
53
EASILY BROKEN WHEN
ELECTRODE IS TAKEN OUT

Declaration and Power of Attorney for Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name,

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者(下記の氏名が一つの場合)もしくは最初かつ共同発明者であると(下記の名称が複数の場合)信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

GREEN-COMPACT ELECTRODE FOR DISCHARGE SURFACE TREATMENT, MANUFACTURING METHOD THEREFOR, METHOD AND APPARATUS FOR PERFORMING DISCHARGE SURFACE TREATMENT AND METHOD OF RECYCLING GREEN-COMPACT ELECTRODE FOR DISCHARGE SURFACE TREATMENT

上記発明の明細書(下記の欄でX印がついていない場合は、本書に添付)は、

the specification of which is attached hereto unless the following box is checked:

~ ___月___日に提出され、米国出願番号または特許協定条約

国際出願番号を _____ とし、

(該当する場合) _____ に訂正されました。

~ was filed on October 19, 1998
as United States Application Number or
PCT International Application Number

PCT/JP98/04707 and was amended on

_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration

(日本語宣言書)

私は、米国法典第35編第119条(a)-(d)項又は第365条(b)項に基き下記の、米国以外の国の少なくとも一カ国を指定している特許協力条約第365条(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications
外国での先行出願

Priority Not Claimed
優先権主張なし

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	☐
P.Hei.10-130316	Japan	13/May/1998	
			☐
			☐

私は、第35編米国法典119条(e)項に基づいて下記の米国特許出願規定に記載された権利をここに主張致します。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)

私は、下記の米国法典第35編第120条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約第365条(c)に基づく権利をここに主張します。又、本出願の各請求範囲の内容が米国法典第35編第112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内又は特許協力条約国際出願提出日までの期間中に入手された、連邦規則法典第37編第1条第56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit of Title 35, United States Code Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose any material information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況: 特許許可済、係属中、放棄済)

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Japanese Language Declaration

(日本語宣言書)

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (*list name and registration number)*

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